What is claimed is:

1. An array for screening cells comprising:

a) a base having a micro-patterned array of chemicals for interaction with cells; and,

b) a non-uniform micro-patterned array of cells seeded on the micro-patterned array of chemicals.

2. The array for screening cells of claim 1, wherein the cells contain at least one luminescent reporter molecule.

3. The array for screening cells of claim 1, further comprising a fluid delivery system for delivering a combinatorial of reagents to the non-uniform micro-patterned array of cells.

4. A method for producing a non-uniform micro-patterned array of cells, comprising:

a) preparing a micro-patterned chemical array;

b) treating the micro-patterned chemical array to produce a modified micro-patterned array of chemicals, by chemically modifying the micro-patterned chemical array non-uniformly; and

c) binding cells to the modified micro-chemical array to produce a non-uniform micro-patterned array of cells.

5. A method for analyzing cells comprising:

a) preparing a non-uniform micro-patterned array of cells wherein the cells contain at least one luminescent reporter molecule;

b) contacting the non-uniform micro-patterned array of cells to a fluid delivery system to deliver fluids to the non-uniform micro-patterned array of cells;

c) acquiring a luminescence image of the entire non-uniform micro-patterned array of cells at low magnification to detect luminescence signals from all wells at once;

d) acquiring a luminescence image of individual wells of the non uniform micro-patterned array of cells at high magnification to obtain luminescence signals from the luminescent reporter molecules in the cells;

e) converting the luminescence signals into digital data; and

f) utilizing the digital data to determine the distribution, environment or activity of the luminescent reporter molecules within the cells.

6. A cell screening system comprising, in combination:

a) a luminescence reader instrument

b) a cassette which can be inserted into the luminescence reader instrument, comprising:

i) a non-uniform micro-patterned array of cells wherein the cells contain at least one luminescent reporter molecule; and

ii) a chamber associated with the non-uniform micro-patterned array of cells and further comprising a fluid delivery system to deliver fluid to the non-uniform micro-patterned array of cells;

c) a digital detector for receiving data from the luminescence reader instrument and converting the data to digital data; and

d) a computer means for receiving and processing digital data from the digital detector.

7. The cell screening system of claim 6, wherein the computer means comprises:

a) a means for digital transfer of the images from the detector to the computer,

b) a display for user interaction and display of assay results,

c) means for processing assay results, and

d) digital storage media for data storage and archiving.

8. The cell screening system of claim 6, wherein the luminescence reader instrument comprises a fluorescence microscope optics.